

REMARKS

This paper responds to the Office Action mailed on May 16, 2006.

Claim 10 is amended, no claims are canceled, and no claims are added; as a result, claims 10-29, 33-38 and 40 are now pending in this application.

§102 Rejection of the Claims

Claims 10 and 25-29 were rejected under 35 U.S.C. § 102(a) for anticipation by Applicant's Admitted Prior Art (AAPA). Applicant respectfully traverses this rejection.

The AAPA discloses a transistor having a total surface area that extends from the edges of the field oxide isolation regions, which is broken up into essentially a first base region (the base contact), a second base region (the intrinsic base), and a third base region (the other base contact) (see figure 1). The implant area (labeled local implant) is in contact with the second base region (intrinsic base). Since the local implant is performed through the opening between the field oxide edges (which is also the mask for the second base region), then the surface area of the local implant is greater than the size of the field oxide opening by at least the standard lateral distribution of the ion implantation, and is wider due to the lateral diffusion from the thermal anneal process. Thus, the local implant necessarily covers an area in the AAPA that is greater than the surface area of the base region, both with and without any side diffusion regions below the surface of the base region (see figure 1 of the present application).

Applicant respectfully submits that the cited reference does not disclose the feature of “...*the implant area having an effective surface area, which is in contact with the second base region, greater than the surface area of the emitter and less than the surface area of the base region between a first edge and a second opposite edge of an oxide isolation region surrounding the transistor, and displaced from the first and third base regions...*”, as recited in claim 10, both as initially presented, and as amended herein. Applicant respectfully disagrees with the statement on page 6 of the outstanding Office Action, that lateral diffusion and lateral ion implantation effects are “unwanted” or “minimal”, and notes that whether or not they are unwanted has no bearing on the features of the final device. The AAPA device discloses a local implant area that is greater than the base region (whether unwanted or not), which results in a

decrease in the peak current at which the transistor gains starts to drop off, due to high current effects related to the increased base collector capacitance, as discussed on page 1 of the present application. Thus, the final devices of the AAPA and the device of claims 10 and 25 have different dimensions and have different performance properties. Applicant has amended claim 10 to make it more clear that the implant area is smaller than the surface area of the base.

Similarly, Applicant respectfully submits that the cited reference does not disclose the feature of “...*the implant surface area being greater than the emitter surface area and less than the intrinsic base surface area between the surface edges of the extrinsic base surrounding the intrinsic base ...*”, as recited in claim 25. The extrinsic base regions in the AAPA are believed to be the P+ regions labeled base contact, which are clearly directly over the local implant region. Thus, the AAPA clearly discloses that the local implant region has an area that is greater than the surface area between the extrinsic base regions, as recited in claim 25. Thus, the cited reference can not anticipate the features of claim 10 or 25, and the present claims do recite that the implant area is less than the intrinsic base, similar to the language of claims 17-24, 34-38 and 40 as so kindly noted by the Examiner in the allowable subject matter section, paragraph 7, page 5 of the outstanding Office Action.

Dependent claims 26-29 are believed to be patentable over the AAPA at least as depending from allowable base claim 25, shown above to be patentable. Applicant respectfully requests that this rejection be reconsidered and withdrawn.

§103 Rejection of the Claims

Claims 13-16 and 33 were rejected under 35 U.S.C. § 103(a) as being unpatentable over AAPA in view of Grubisich (U.S. 5,581,115). Applicant respectfully traverses this rejection.

The cited reference of the AAPA has features discussed above with reference to the prior rejection. Grubisich discloses an implant region 58 (see figure 2 as discussed in the outstanding Office Action, and col. 5, line 1), which is in contact with the extrinsic base regions 54.

Applicant respectfully submits that the cited combination of references, whether taken alone or in any combination, does not disclose the feature of “...*implant region having an ...effective surface area greater than the surface area of the emitter region and less than the area of the intrinsic base region contiguous to the collector region, wherein the effective surface area*”

is in contact with the base region, and spaced apart from the extrinsic base region...”, as recited in claim 13. As discussed above, the AAPA discloses an implanted region that is larger than the intrinsic base region, and Grubisich discloses that the implanted region touches the extrinsic base regions 54.

Applicant respectfully submits that the cited combination of references, whether taken alone or in any combination, does not disclose the feature of “...*an implant area of the collector region vertically adjacent to the first portion of the base region having an increased collector doping of an implanted impurity, the implant area having an effective surface area that is in contact with the base region, greater than the surface area of the emitter region and less than the surface area of the first portion of the base region...*”, as recited in claim 33. As noted above the AAPA is larger than the base region, and Grubisich has the implant region touching the extrinsic base. Thus, the combination of cited references still does not contain all the recited features of the independent claims.

The dependent claims are believed to be patentable over the suggested combination of references, whether taken alone or in any combination, at least as depending from allowable base claims. Applicant respectfully requests that this rejection be reconsidered and withdrawn.

Claims 11 and 12 were rejected under 35 U.S.C. § 103(a) as being unpatentable over AAPA as applied to claim 10 above, and further in view of Grubisich. Applicant respectfully traverses this rejection.

The cited references of the AAPA and Grubisich have features discussed above with reference to the prior rejection. Applicant respectfully submits that the suggested combination fails to describe or suggest at least the claimed features of “...*the implant area having an effective surface area ... greater than the surface area of the emitter and less than the surface area of the base region between a first edge and a second opposite edge of an oxide isolation region surrounding the transistor ...*”, as recited in claim 10, both as initially presented, and as amended herein. The AAPA has an implant area that causes a problem in increasing the base to collector capacitance, as discussed above. The AAPA implant region is larger than the surface area of the base region. Grubisich has the implant region contacts the extrinsic base regions.

The present claim 10 has an implant region that is much smaller than the base surface area. This is true either before or after the current amendment adding that the surface area is between the edges of the isolation oxide. The amendment has been made to further clarify that the implant region is smaller than the base surface area, as discussed above.

The dependent claims in question are seen as being in patentable condition at least as depending from allowable base claim 10. In view of the above, Applicant respectfully requests that this rejection be reconsidered and withdrawn.

Allowable Subject Matter

Claims 17-24, 34-38 and 40 were allowed. Applicant thanks the Examiner for the indication of allowable subject matter.

CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney David Suhl at (508) 865-8211, or the undersigned attorney at (612) 349-9587 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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Date

17 July '06

By


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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being filed using the USPTO's electronic filing system EFS-Web, and is addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 17 day of July, 2006.

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